

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

JUN 20 1910

LIBRARY

RECEIVED

JUN 23 1910

VOLUME XVI.

U. S. Department of Agriculture
NUMBER 9

THE AGRICULTURAL STUDENT

A MONTHLY MAGAZINE DEVOTED TO AGRICULTURAL EDUCATION



JUNE, 1910

10 Cents per Copy

50 Cents per Year

U. S. Cream Separators

The **Recognized Criterion** by which others are judged.

The modern dairymen want a Cream Separator that fulfills to the highest degree these **three requirements**:

Close Skimming, Easy Running, Long Life.

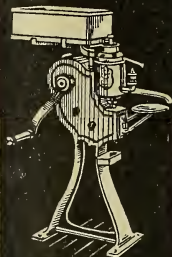
The U. S. is the **only separator** that combines leadership in **all three** of these essentials.

The U. S. has received more and higher awards (acknowledging its superiority) in 1909 than all other makes combined.

A request for Catalog will show you all about this thoroughly practical separator and tell you all about our latest awards.

Vermont Farm Machine, Co., Bellows Falls, Vt.

Holds Worlds Record



Holds Grand Prize

FOR THOSE THAT OWN



**SHEEP
HOGS
CATTLE
HORSES
POULTRY
DOGS
PET
STOCK**

Its use permitted in official dipping for scab on sheep.

Let us quote you on dipping tanks.

W. E. Minor & Co.

800 Long Ave., CLEVELAND, O.

Used and endorsed by the Ohio State University.

For Sale!

Scotch Collie Pups
\$5.00 each

Sleeter Bull

1630 NEIL AVENUE
Citizens Phone 16236

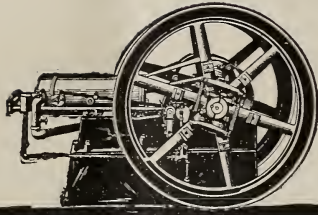
The McDonald Hardware Company

1204 NORTH HIGH STREET

Citizens Phone 5746—Bell Phone, North 1983

DISCOUNTS TO STUDENTS

Please mention THE AGRICULTURAL STUDENT to advertisers.



GET AN I.H.C. GASOLINE ENGINE TO WORK FOR YOU

I H. C. engines and prosperity are going hand-in-hand on thousands of farms. I. H. C. gasoline engines are the farmers' willing workers that do not ask for wages or days off or refuse to work when the weather is bad.

Just give the wheel a turn—and a whole string of your other machines will get busy. You can run half a dozen of them at once, if you like—sawing, grinding, churning, separating cream, pumping water, etc. Your simple, powerful I. H. C. gasoline engine will furnish power for them all.

One great advantage of these engines is their ever readiness. They enable you to do your hardest jobs faster, better and easier than ever you have been able to do them before.

There are hundreds of places where you would like to use a power—sometimes for just a little while, other times for a long, steady run. Many a time you can have the job done with your I. H. C. gasoline engine before you could even get ready with your old-style power. If it's a long, steady run, like a day's job of sawing wood, the engine will keep your saw going steadily hour after hour. The engine will take care of itself—all you have to do is to just 'saw wood.

The expense is only a few cents for gasoline for the whole day's work. There's no waste of time and fuel in starting up. And all expense stops the instant the work stops.

You need an I. H. C. engine to take the short cut on your work. Figure on the matter—see how soon it will pay for itself by getting full service for you out of your other machines. The engines are simple and easy to understand. You will have no trouble in learning to operate one of them.

Go to our local agent and look over the line. It includes an engine for every section and every problem; of all sizes and all costs, for all farm uses—vertical and horizontal (both stationary and portable); engines on skids; sawing, pumping and spraying outfits. It also includes I. H. C. gasoline tractors—first-prize-gold-medal winners—the best all-round farm tractor by test.

Call on our local agent in your town and talk the matter over with him. He will supply you with catalogues and all information. Or, if you prefer, address us for catalogue and full particulars.

INTERNATIONAL HARVESTER COMPANY OF AMERICA

(Incorporated)

Chicago, U. S. A.



THE I-H-C LINE

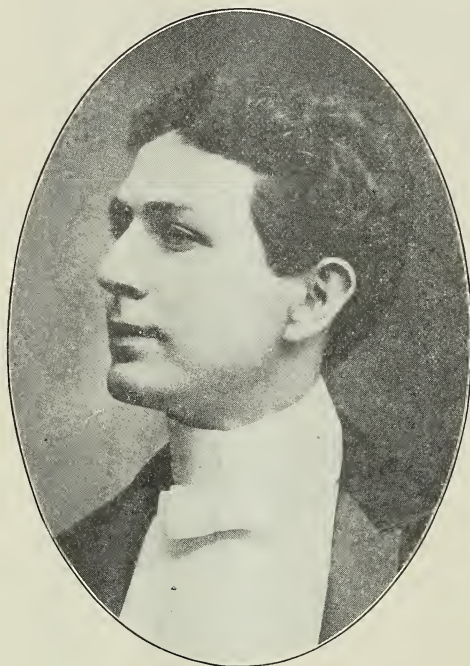
LOOK FOR THE I. H. C. TRADE MARK. IT IS A SEAL OF EXCELLENCE AND A GUARANTEE OF QUALITY

SEASON 1909-10

To Those Who Neglected to Learn to Dance:

Prof. W. J. Rader's Academies of Dancing

Will organize beginners classes as follows:



Summer Pavilion

Located on Neil Ave., between Goodale St. and Poplar Ave. Open Tuesday, Friday and Saturday evenings.

Operated on Summer plan.

High St. Academy

199½ S. HIGH ST.

Phones: Auto 3456; Bell 5877

Will organize a beginners' class Wednesday evening, June 15th, 7:30 o'clock.

Neil Ave. Academy

647 NEIL AVE.

Phones: Auto 4431; Bell 6189

Will organize a beginners' class Friday evening, June 17th, 7:30 o'clock.

New Oak St. Academy

827 OAK ST.

Phones: Auto 4431; Bell 6189

The Academy has been rearranged for functions of all sizes and is complete in every respect.

TUITION.

Gentlemen, per term of 10 lessons \$4.00

Ladies, per term of 10 lessons... 3.00

Private lessons, \$1.00 per lesson;

six lessons 5.00

Private lessons can be had afternoons or evenings.

Tuition can be paid \$1.00 per week until paid. The Waltz, Two-Step, Three-Step, Columbus Minuet and Rye Waltz taught in one term.

Academies and Pavilion can be secured for private parties, clubs dances, Fraternity hops, etc.

ORR-KIEFER



COLVMBVS, O.

Orr-Kiefer Studio Co.

199-201 SOUTH HIGH STREET

Artistic Photography

"Just a little better than the best"
SPECIAL RATES TO STUDENTS

We Frame Pictures of all kinds — RIGHT

Try **Yeager, the Tailor**

ALWAYS RELIABLE AND UP-TO-DATE.

395 SOUTH HIGH STREET.

TYPEWRITERS



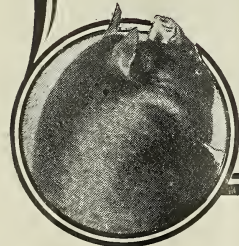
All makes sold and rented one-half price and less.
Guaranteed.

THE TYPEWRITER EXCHANGE

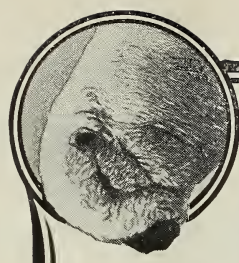
25½ North High Street

Citz. Phone 7119

Bell Phone 1771



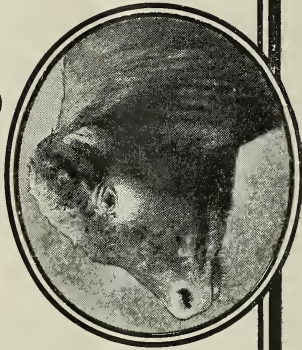
FOR "SALES THAT SUIT"
CONSIGN YOUR LIVE STOCK TO



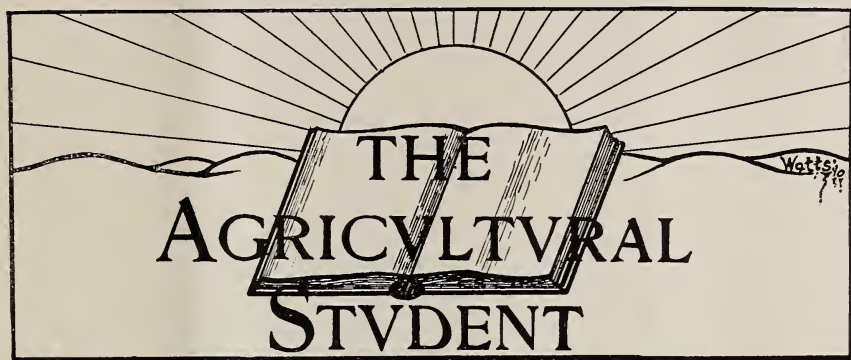
CLAY BLINSON & CO.

East Buffalo
South Omaha
Sioux City
South St. Paul

Chicago



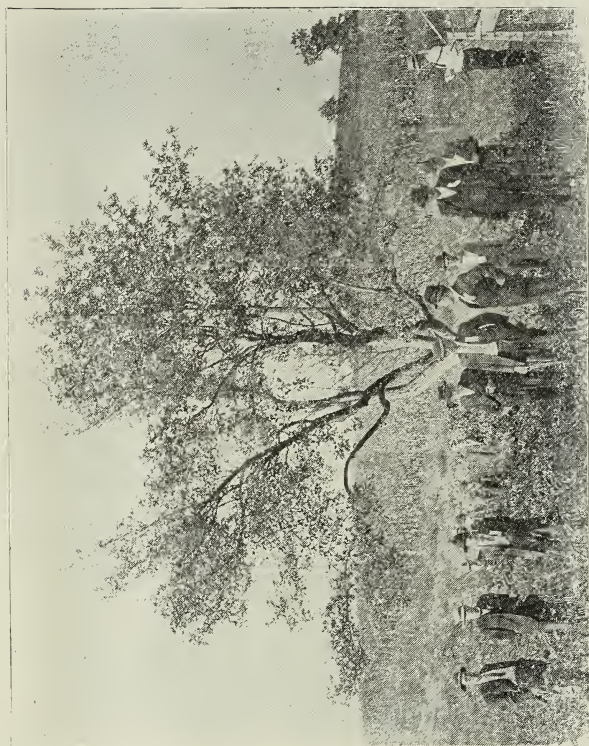
Kansas City
South St. Joseph
East St. Louis
Denver



Contents for June 1910

BOBOLINK	Cover
FRONTISPIECE.	
	Page
PRUNING—	
Prof. Wendall Paddock.....	7
CAMPUS BIRD NOTES—	
Robert J. Sim	12
THE TRIP TO MAXWALTON—	
J. F. Walker	13
PHOSPHATES—	
W. H. Darst	15
THE VILLAGE OF KHARMAPUR, U. P., INDIA—	
Sam Higginbottom	19
EDITORIAL	22
NEWS NOTES	24





An Old Tree Correctly Pruned. Same tree unpruned on page 9.

THE AGRICULTURAL STUDENT

Vol. XVI.

OHIO STATE UNIVERSITY, COLUMBUS, JUNE, 1910

Number 9

Pruning

By Prof. Wendell Paddock

"Yet, in the wild disorder, art pervades,
Designs, corrects, and regulate the
whole,
Herself the while unseen."

The neglected trees of the home orchard which one sees on nearly every farm are mute but striking examples of the owner's failure to adapt himself to changed conditions. Many of us can remember when fine fruit grew on these trees, not because of our skill in orcharding, but rather, in spite of us. But there came a time when this was changed, and wormy, scabby fruit was the rule. It seems to have been an effort for the majority of orchard owners to grasp the principles of spraying. At any rate, the use of Bordeaux mixture, arsenate of lead, and the lime-sulphur mixtures are known only to the few.

Of late years the San Jose Scale has made its appearance and it now seems inevitable that the stately old apple trees which one expects to find in connection with all of the older farm homes will soon be things of the past. In the meantime prices have gradually risen until it is now a question whether all of the country boys and girls get their share of fruit.

Much may be done with the old orchards to counteract years of neglect, as trees usually respond quickly to intelligent culture. The first step in renovating the orchard should be the prun-

ing, consequently it seems desirable that this paper be confined to that subject. In order to get at the principles of the subject, however, it is best to start with the young tree; consequently that plan will be followed.

In the first place it may be adopted as a rule that the tops of nearly all trees and plants should be cut back at the time they are transplanted. This is true for the reason that practically all of the moisture which plants use is taken from the soil by the delicate root hairs. These organs occur only near the ends of the smaller roots and are of short life. They never become true roots, but are being formed continually, and are as constantly dying throughout the growing season. There are no root hairs present, then, on trees when they are received from the nursery. They usually do have, however, overgrown tops, and in the majority of instances the trees are planted as they are received, with but little pruning. The large top looks good to the planter and he is apt to think that such trees have an advantage over those which have less growth. The average man hesitates to remove any of these limbs or to cut them back, for the reason that it no doubt appears that he will be losing in the time it takes a tree to come to maturity. The facts are, however, trees give off moisture from their limbs when

they are dormant just the same as they do when covered with leaves, but of course to a much lesser extent. The young trees have been deprived of a good portion of their root systems in digging and, as there are no root hairs present, it is evident that the moisture which escapes comes from a supply which is stored in the tissues of the plant. Should the air be sufficiently warm, the buds of the newly transplanted tree, if planted in the spring time, may push into growth a long time before root hairs are developed. These bursting buds draw heavily upon the stored moisture and plant food, and if this action is long continued it may be a great drain upon the vitality of the tree. In some instances, indeed, an overgrown top with its great number of opening buds, may so exhaust the reserve moisture and plant food that the tree will die before the roots are in condition to supply more. This is one important reason why practically all transplanted plants, with exception of the evergreens, should be headed back when planted.

Another important reason for cutting back the tops of newly planted trees is, that it is important that the frame work of the tree be started just right. It is now generally conceded that low-headed trees are desirable. Just what constitutes a low head is perhaps a question, but all trees with a distance of 30 inches or less between the ground and the lowest limb, may be considered in this class. Personally, the writer prefers that the first limb should come out at a much lower distance above the surface of the ground, particularly with stone fruits.

Apple and pear trees, as commonly planted, when two years old, have their limbs already formed, and from these the scaffold limbs must be selected. A

great many years of experience of practical orchard men prove that four or five scaffold limbs are a sufficient number with which to start the young tree.

Suppose then that we start with a two-year-old apple or pear tree as it comes to us from the nursery-man, with eight or ten vigorous lateral branches. We should begin with a branch nearest the point where we wish the head to start and remove all which are below. Then above this branch three or four others are selected which are a good distance apart and are arranged in a spiral manner about the trunk, so as to form a symmetrical, well-balanced top. All of the others are cut away and the terminal branch is cut out just above the last selected branch. These selected branches are then headed in to about fourteen inches in length, when the shaping of the top at planting time may be said to be complete.

The roots, of course, should receive attention. Any straggling roots should be shortened in and bruised roots should be trimmed back of any sign of injury. During the growing season perhaps a majority of the buds which form upon the scaffold limbs will grow into branches. Most of these branches may be allowed to grow, as the tree needs a large leaf surface in order to manufacture the necessary amount of plant food. During the next winter the first pruning is given. We will now select, as a rule, two branches on each of the scaffold limbs: one at the end and the other at any advantageous position between the end and the trunk; cut them back to about fourteen inches in length and remove all of the others. This process should be repeated through the first four years of the life of the tree, when the frame work of the tree may be said to be complete. In selecting branches for this framework they should always

be chosen in reference to making a well-balanced top.

If there happens to be an open space on any part of the tree, branches should be selected which point in this general direction; then, too, by cutting just above buds which point in the direction that branches are wanted, much may be done to correct the faults of growth. Upright growing trees may be

which have been treated in this manner. The question of removing the tops in order that spraying may be satisfactorily done will never arise. It is also true that the four or five scaffold limbs first started will produce as large a bearing surface as the tree can use, and it will also be found that the branches will be stocky and stout and will easily stand up under any load that may be



Old Tree Unpruned. See Frontispiece.

spread somewhat by cutting just above laterals or buds which point outward. Spreading trees may be contracted to a certain extent in the same manner. The after pruning of such trees is very simple. All that needs to be done is to thin out the branches where they tend to form crotches or to cross one another. Then all the very long branches should be headed back annually, as it is a good plan to keep the bearing wood where the fruit may be easily picked, or sprayed. It will seldom be necessary to remove large branches from trees

placed upon them. The very fact that the branch is cut back insures that it will become stout and stocky. The long, willowy branches, which bend under a load, and often break, will be almost entirely done away with. The system of pruning as described above will produce a low, open-centered tree. Now that spraying has become so important, the advantage of this type of tree over the old-fashioned two-story kind will be readily apparent. However, if one prefers the tree with a central leader, the method of heading in the young tree

will be just the same. The top-most branch, however, should be left a little longer and this will soon grow upright, when a second top may be begun the year following.

A good distance between the scaffold limbs on the main branch is always to be desired. Such trees may look awkward when young, but one should have a picture in his mind's eye of how they will appear when ten or more years of age. Branches which are eight inches apart on yearling trees will crowd at the end of that time. It is, of course, true that a stronger tree results if the pull of the lead is distributed up and down a longer surface of trunk, than if they all crowd out at almost the same point.

One advantage of planting yearling whips, when they can be secured, is that the grower can form a top at almost any point he wishes. All too often the nurseryman cuts away too many of the under branches on the two-year-old tree, thereby forcing the grower to have high-headed trees whether he likes them or not.

Peach trees should be planted when the tops are one year old, as older trees do not usually give nearly as good satisfaction. Many of the lateral buds on stone-fruit trees produce branches the first year. The pruning at planting time commonly consists of cutting the top back to about 18 inches in length and reducing all the laterals to spurs of one bud in length. These are mostly allowed to grow the first season, but at the first pruning, from three to five scaffold limbs are selected, as is the case with the apple. The after pruning is much as has been described above. The bearing wood of the peach is always on the previous season's growth. It is important then, that the peach be pruned every year, for if this is not done, the

bearing surface gets farther from the ground every year, and we soon have a tall, straggly tree with a fringe of fruit-bearing wood at the top and at a great distance from the ground. By skillful pruning, peach trees may be forced to spread out and to have a succession of bearing wood from close to the ground up. The outline of a well-trained peach tree should just about conform to a right triangle, and at least two-thirds of the fruit should be picked from the ground.

Plum and cherry trees do not require quite so systematic pruning, but they, too, respond to intelligent care in this respect.

No system can be described that will apply to old, neglected trees, for the reason that each tree presents a separate problem. Many of these trees are so tall that they cannot be successfully sprayed, even with the use of towers and extension poles. In such cases the tops must be cut back so that all of the trees may be readily accessible. The dead wood should first be removed, then where the branches are too thick, they must be thinned. The very long limbs which droop when loaded with fruit, may well be shortened, and the taller ones cut back to a reasonable length. One rule should always be observed in cutting limbs, and that is to make the cut just above a side or lateral branch, for, if this is not done, a so-called stub-cut results, the end of which never heals satisfactorily. By cutting above a stout lateral branch, a good callus will ordinarily form over the wound and the formation of numerous water sprouts will be largely prevented. In any kind of pruning, good pruning tools should of course be used. The axe is never permissible in the orchard. It is always a mistake to cut off very large limbs when this can be avoided, but when this is neces-

sary it is well to saw part way through the branch from the under side first. This will prevent the splitting down of the limb. The forming of stubs should ordinarily be avoided as the cut never can heal over, but if a cut is made close to the main branch or trunk, all the wounds will heal unless they are on top of the branch. Such wounds present a broad, level surface, which cracks and holds moisture, and are pretty sure to result in the death of the particular limb and later in the death of the tree. The large upright branches then, should not be removed where this can be avoided.

One should make a careful study of the character of the different limbs upon his trees, so as to be able to distinguish fruit spurs and fruit-bearing wood from water sprouts. A mistake commonly is made to prune the trees from the bottom up, thereby cutting off many fruit spurs and removing the fruit bearing wood to the outer edge of the long limbs. It is a far better plan to have the fruit-bearing surface close to the ground and well distributed over the entire tree. This may be done by systematically heading in the longer growing branches and by thinning out the top so as to let in the sunlight and air.

Water sprouts will usually develop in a greater or less number after a vigorous pruning has been given, but these are easily removed and should be cut out each season. All wounds over an inch and a half in diameter should be protected with a thick coat of lead paint. After the pruning has been done, steps to combat insects and fungous diseases should be taken, for it is now impossible to grow good fruit without spraying.

Then it is possible that the old orchard may need some attention in the way of cultivating and manuring, but with proper care the old trees may even yet be made to produce paying crops, and they are certainly worth consideration. One often hears of the high price of western orchard lands and of the immense crops that are grown. Eastern orchards should be just as valuable when given proper care. One would not need to be very successful to get an average net income of \$150 an acre per orchard. If this can be done it would mean that the land will pay 6 per cent. on an investment of \$2,500 an acre. There are few crops which the farmer can grow that will pay better and, usually, one who is fortunate enough to have even a few old apple trees cannot afford longer to neglect them.



Campus Bird Notes

By Robert J. Sim

We call June the month of roses and the bird-man is willing to let it go at that; for this is the month of no particular bird. In April the woodpeckers, with their clatter, always make me think of them, and in May come warbler days. October, for further instance, is the sparrow month. But now there is no preponderance of any one group. It is summer. The grass is long in the meadows, collars are inclined to wilt, and the birds of Ohio are scattered all over the family tree and settled in their summer homes. June is the home month—now I've hit it—and our avian neighbors are to be classified accordingly. Birds of the meadow, birds of the lawn, wood, and swamp. Home is the word. In May, things are moving, but in June the birds "stay put."

As we hurry to an 8 o'clock a meadowlark buzzes up from the edge of the cinder-path shewing a white-margined tail as he goes. Further on a flicker is seen busily engaged in pumping up a breakfast of ants from a hole in the ground. This is truly an eccentric woodpecker which has acquired terrestrial habits and a brown coat to match. The red-head also departs from the conventional woodpecker way and performs a fly-catching specialty which is quite amazing. Moreover, this bird refuses to be classified according to locality. He nests indifferently in some isolated meadow-tree, a telegraph pole, orchard or forest.

In the morning the campus trees are full of "sounds and sweet airs that give delight and hurt not." The brown thrasher on the topmost branch of a sycamore sings a big healthy song in tones which remind me of "Hail!

Hail! The gang's all here." His more ladylike relative, the cat-bird, hums and whistles oftly in the bushes, or perches sometimes in uffish thought upon the No-Walk-Here sign.

The purple martin often takes a dip in Mirror Lake, then rests on the wires over the water. Like the other swallows, from a purely utilitarian point of view the martin is an excellent bird, for he feeds exclusively upon insects. Likewise he is fine looking, but his voice I do not approve of. It is too overpoweringly brassy. For comparison, think of the musical twitter of the barn swallow.

About noon nearly everything is silent. A vireo or two may be heard singing among the branches, but there is little else. Morning and evening are the best times for the naturalist to be abroad. What do we find towards night? Down in the lagoon by the alfalfa field a frog is muttering, "Bull-Durham, Bull-Durham." A nighthawk flies over occasionally, grunting a high nasal note. In the field a dickcissel sings. Call it that. The effort deserves some name.

Between songs all these birds are busy friends of the farmer. They compliment each other in their constant warfare against insects and weeds. There is a day shift and a night shift. Some explore the leaves for aphids and others drill for wood-borers. Some rid our fruit trees of caterpillars and the meadow-birds take care of the grasshoppers. The swallows and swifts clear the air by day and the nighthawks feed upon nocturnal insects. The sparrows are insectivorous until the weed-seeds ripen. And so it goes. The birds work full

time and take no holidays. Every one looks after his own business. Of course each bird's business is keeping alive and keeping his race alive, and we humans are fortunate in being bene-

fited incidentally. The music is a bi-product. Here I think we have the advantage. Does the song sparrow enjoy my whistling as much as I do his?

The Trip to Maxwalton

By J. F. Walker

When we find ourselves busily engaged day in and day out from one week's end to another, there is nothing that gives keener pleasure than occasionally to take a day off for a trip. To students of Animal Husbandry there could be no better destination for such a trip than the well-known Shorthorn herd of Carpenter & Ross, near Mansfield, Ohio. The members of the Special Stock Judging Class were highly delighted, therefore, when they became informed that Prof. Marshall had arranged for a visit to this herd on Saturday, May 14th. We had seen the 1909 Grand Champion Bull, "Selection," at Thomas Johnson's the week before and all were very anxious to see this animal's sire and dam, who reside in the Mansfield herd. Another thing that made us all eager for the trip was to see the Carpenter & Ross sale stock, which was to be put up at auction ten days later.

The party, including Prof. Marshall, David Fyffe, and eight students, left Union Station via Big Four at 7:20 Saturday morning, arriving at Galion at 9 o'clock. From there we took the traction across to Mansfield and by a kind arrangement of Mr. Carpenter, were then driven by livery to the farm, east of town. We arrived at "Maxwalton" about 11:30 and had time to see a few of the cattle and to make friends with

the colliers before we were invited in to dinner. Invited in to forget the discomfort of a cold damp day, and to listen to the conversation of our superior friends, and the music of the phonograph.

After dinner Messrs. Carpenter and Ross escorted us to a nearby field to see some calves. A fine bunch they were, too, showing breediness and even type which was pleasing to the eye. We rounded up several rings of these calves for placement and discussion.

Leaving the calves we went to the barn and a ring of five bulls was brought out. At the head of the ring stood the great herd bull "Avondale," whose record is one of which to be proud. He has won a great many of the most coveted ribbons at the prominent shows and is the sire of a large number of purse-winning bulls and heifers. Among others he is the sire of "Selection," above mentioned, and also of "Dale's Gift," 1909 International Junior Champion Heifer. To cap the climax, he was the blue ribboner of the "Get of Sire" class at Chicago 1909. Next to "Avondale" stood "Shenstone Albino," another noted show bull. He was bred by Mr. R. P. Cooper, Shenstone, Eng., and was a noted winner before being brought to America. In 1909 he was Grand Champion at the Alaskan-Yukon-Pacific Exposition, at the Denver

and the Fort Worth Shows, and was Senior Champion at the International. He is a wonderfully deep, thick animal, with a splendid covering of flesh.

It is beyond the limits of space to discuss in detail the other three bulls in the ring, and though not the equal of either of the bulls mentioned, they were high class animals. In the placing, "Avondale," though excelling all others in breed and sex character, was forced to yield his place at the head of the ring to "Shenstone Albino," with his low, blocky body, and deep, even covering of flesh.

The next rings was one of three cows, and included "Sweet Duchess of Gloster," who has since sold for \$1300. In the ring of four cows which followed, was the above mentioned "Dale's Gift." After the placing of each of these rings a good deal of interesting discussion was brought forth, in which both students and authorities took part.

Leaving the barn, we visited the pasture, where we saw a large number of high class breeding cows; among others the dam of "Selection."

About 3:30 we walked down the railroad track from the pasture to where

an engine and special car waited to take us into Mansfield—most privileged gentlemen to have a special train! From Mansfield we went over through Crestline to Bucyrus, and arriving at this place went immediately to the hotel for supper. At the close of the meal a cab awaited at the door, and to the great astonishment of the bystanders, nine of us in and on top of this vehicle which was designed for four, started off to the depot. Later, the cabman and his exhausted team were dismissed and a Penna. train boarded for Columbus.

It was stated at the outset that there was no more appropriate destination for a party of Animal Husbandry students than this famous Shorthorn herd near Mansfield, and if a census could have been taken when the train pulled in at 8:40 Saturday night, every member of the party would have assented to this opinion. During the trip we had become more intimately acquainted with each other, we had seen some of the larger towns and splendid farms of North Central Ohio, and most important of all we had judged some real Shorthorns. In other words, the trip to "Maxwalton" had paid.



Sheep on the Range

Phosphates

By W. H. Darst

The number of phosphates or materials used chiefly or wholly for their phosphoric acid, available for use in the United States are large, but all may be included under five heads:

First—Bone and materials derived from them, as ground bone, both raw and steamed, bone black and bone ash.

Second—Mineral phosphates as apatite, South Carolina rock, Florida phosphates (hard and soft), and Tennessee phosphates.

Third—Phosphoric guanos, mona guanos, etc.

Fourth—Phosphatic slag or basic slag produced in the manufacture of steel.

Fifth—The manufactured phosphates, including super-phosphates, acid phosphates and desolved phosphates.

When using bones as a source of fertilizer, they should be steamed to remove the ossein, a fatty material. The reason for removing this material is to make the bones grind into a fine powder with more ease. This does not lessen the value, as ossein is made up of carbon, hydrogen and oxygen to a greater extent. Oils may hinder the plant from using the fertilizer or may clog the meal and hinder it from putrefication, or again this fat may form an insoluble soap which incrusts the meal. When these oils and fats are left in, the action of the manure is very slow, where if removed the manure is made into a quick acting and powerful manure. In spite of the fact that writers are boosting the rock super-phosphates, there is hardly a doubt that bone will continue to be used as a manure, as it has its own place and peculiar advantages. The proper ways in which to employ it will no doubt be accurately formu-

lated in the course of time. Bone meal should be used on a freshly broken land, or when the organic matter is high and the soil full of refuse crop, or stubble ground. Bone meal should not be used when the land is too stiff and dry.

Bone ash is not a particular efficient fertilizer, much less than bone meal. Most of this material is shipped from South America, where bones are used as a fuel. Bone ash contains about 60 to 80 per cent. of phosphate of lime and magnesia and about 30 to 38 per cent. of phosphoric acid. This material has to be ground and sulphuric acid applied to make it most effective as a fertilizer. The making of the super-phosphates from the bone ash is more simple and easy than when made from the green bone. In the latter case, the ossein tends to combine with the sulphuric acid, making the process very expensive, while the only advantage being a certain proportion of nitrogen and ammonia gained in the decomposition of the ossein, which will not recompense for the expense of acid used.

The mineral phosphates are generally mined, and found in hard stone-like deposits. Apatite was the first form used as a fertilizer. It contains about 40 per cent. P_2O_5 and 50 per cent. lime. Large beds are found in New Hampshire, Maine, Massachusetts, New York, New Jersey, Maryland, Delaware and North Carolina. Coprolites is another form of phosphate of lime occurring in nodules, having probably an organic origin of 50 to 60 per cent. phosphoric acid. This form is found in North Carolina, Alabama and Florida. Phosphate rock, hard and soft, is found in many

parts of the United States. The commercial points being South Carolina, Florida, Virginia, North Carolina, and Tennessee.

No kind of natural phosphates is of much value when applied to the soil, either directly in nodules, or in the finely ground state. In soils very rich in vegetable molds or organic matter, natural phosphates may be used with good results. It is important that rock phosphates be as pure as possible, for if they contain large amounts of calcium carbonate, using large amounts of the expensive acid. Sand and silica in the natural phosphates will not be objectionable.

At this time it will be well to mention the different forms of phosphates relating to our purposes.

1st: The natural phosphates, bone phosphate, rock phosphates, tricalcium phosphate, or strong acid soluble phosphate, ($\text{CaO}_3 \text{ P}_2\text{O}_5$; all these terms relate to the same form.

2nd: The reverted phosphate or citrate soluble or dicalcium phosphate ($2\text{CaO H}_2\text{O P}_2\text{O}_5$).

3rd: The super-phosphate or water soluble or monocalcium phosphate ($\text{CaO } 2\text{H}_2\text{O P}_2\text{O}_5$).

The action of sulphuric acid upon the tricalcium phosphate may be represented by the following equation, which converts it into the super-phosphate or water soluble form: $3\text{CaO P}_2\text{O}_5 + 2\text{H}_2\text{SO}_4 = 2\text{CaOSO}_4 + \text{CaO } 2\text{H}_2\text{O P}_2\text{O}_5$. The latter product being the super-phosphate.

The reverted form is produced at least to some extent by tricalcium phosphate in excess as in the equation: $\text{CaO } 2\text{H}_2\text{O, P}_2\text{O}_5 + 3\text{CaO, P}_2\text{O}_5 = 2(2\text{CaO, H}_2\text{O, P}_2\text{O}_5)$. This product is insoluble in water. This form is available to plants and is found in the soil after the reaction of Ca, Fe, or Al. on the super-phos-

phates applied as a fertilizer to the soil.

The reason for going to the expense of making the insoluble forms into the soluble form, is the more thorough distribution of it, while in the soluble form. When applied by the drill, followed by a rain, this soluble form is carried to all parts of the soil in solution; it then comes in contact with CaO or Fe and Al, which changes it back into the reverted form, fixing it in the soil, ready for the weak acids of plant roots to dissolve and take it up.

The great trouble in regard to super-phosphates in fertilizers is its tendency to reversion, the causes of which are two-fold. When treating the tri-calcium phosphates with sulphuric acid it is not desirable to have an excess of acid, hence some undecomposed phosphates are left present in the bulk, which attacks the super-phosphates and causes the reverted product. When an excess of acid is used this will have to be removed by some drying agent as bone black, bone ash or lime. This will be adding some undecomposed phosphate, which in turn will cause the reverted phosphate again to be formed. This amount of reverted material will depend on the undecomposed phosphate present. The proportions governing this change being three parts of undecomposed to one part of super-phosphate. Again impurities in the insoluble phosphates may cause a reversion. When iron and alumina are present, these may cause this reversion. The exact reaction has not been made out very clearly, however. It may be supposed that iron and alumina may be partly dissolved by the sulphuric acid forming a sulphate, which reacts on the super-phosphates, forming the reverted and more acid: $2\text{Fe}_2\text{O}_3, 3\text{SO}_3 + \text{CaO, } 2\text{H}_2\text{O, P}_2\text{O}_5 = \text{Fe}_2\text{O}_3, \text{P}_2\text{O}_5 + \text{CaO, SO}_3 + 2(\text{H}_2\text{O, SO}_3)$. Here we have more free acid, which would proceed to

dissolve more iron or alumina, hence continue to form the insoluble Fe_2O_3 , P_2O_5 . Or we may have simply the oxide of iron as $2\text{Fe}_2\text{O}_3 + 3(\text{CaO}, 2\text{H}_2\text{O}, \text{P}_2\text{O}_5) = 2\text{Fe}_2\text{O}_3, \text{P}_2\text{O}_5 + 3\text{CaO}, \text{P}_2\text{O}_5$. Supposing the dicalcium phosphate was not formed, but $\text{Fe}_2\text{O}_3, \text{P}_2\text{O}_5$ or $\text{Al}_2\text{O}_3, \text{P}_2\text{O}_5$, this would be called also reverted and moreover of the worst kind. The aluminium and iron phosphates are notori-

sure it has become fixed in the soil and that no free acid is still in evidence, as this will cause a bad effect on the micro-organism found in the soil. Sulphuric acid diluted to one in a thousand parts has been used in killing grass and weeds, especially when lime is not in abundance in the soil. It has been found that super-phosphates applied to barnyard manure will kill the bacteria.



Effect of Phosphates on Potatoes: 1. Soluble Phosphates. 2. Florida Rock "Floats". 3. Iron and Alumina Phosphates. 4. No Phosphate. (Maine Exp. Station.)

ously insoluble and are not worth as much as the dicalcium or reverted phosphates.

Super-phosphates will likely cause retarded germination in seeds, but when plants are once up the growth is more rapid than when nitrogen is used alone. In general, phosphatic manures promote early maturity of crops. And their value as a fertilizer will depend greatly on the state of division when applied to the soil; that is to say, the finer the material the more available it becomes to plants.

The time for applying super-phosphates in the ground should be long enough before the crop is planted to be

This would teach us not to apply barnyard manure until we are sure no free phosphates are in evidence. The dicalcium phosphate can be safely used with barnyard manure where it is more economical to be applied together, the calcium in the phosphate acting as a flocculator of the soil, improving the structure and preventing puddling of our stiffer soils.

The valuation of the reverted phosphate has been disputed by chemists, however practically all agree it should not be classed with the tricalcium phosphates, but assigned a somewhat higher value. The true value of this form depends on the soil it is used

upon; when used on calcarious soils it will not have the value of the soluble phosphates; however, it will give the best results if applied to noncalcarious and moor lands or sandy soils. Such soils as these are generally poor in lime and rich in iron and alumina, which will readily combine with the superphosphates, forming compounds that are more soluble than when in combination with lime.

Phosphatic slag is obtained in the reverted form, in the Thomas process of refining pig iron, the phosphorous in the iron combining with calcium carbonate used as a flux. The per cent. varies according to the amount of phosphorus in the iron ore. It is not very practical to use sulphuric acid to convert this into the super-phosphate, as the iron present will soon revert it again.. Basic slag when ground to fine powder has been proven better than the ground rock phosphate or floats. Slag may be regarded as a useful fertilizer on soils which are benefited by the better kinds of phosphate fertilizers, and espe-

cially those that are sour and are helped by liming.

While super-phosphates are most economical on soils that contain lime, bone meal, flats and slag are to be especially recommended for soils deficient in lime, which would include sour lands, moor lands and bogs. Experiments have shown basic slag to be more effective and cheaper than floats, ground rock or phosphatic guanos.

Phosphatic guanos are produced by accumulation of dung from sea fowls, the soluble parts being washed away and phosphate of lime being left, sometimes in the state of tolerable purity. Often this is contaminated with compounds of alumina and iron.

Guanos are found on the island in the Pacific Ocean and Caribbean Sea. Generally speaking these guanos are easily acted upon by acids and several are well fitted for making high grade super-phosphates, as those found on Baker Island. However, this form of phosphates is now nearly exhausted, so are not of great importance as a source of phosphorus.



The Village of Kharmapur, U. P., India

By Sam Higginbottom

The village of Kharmapur is located on the main road from Allahabad to Jubblepur. It is six miles distant from the former city. It has a population of two hundred and fifty souls, or sixty families. The dwelling houses are located in the center of the cultivated land. Its area is two hundred and forty acres. The boundaries are the irregular footpaths separating the village from the neighboring contiguous villages.

The size of the community is determined by the amount of food which the land produces. The main road which runs through the center has two double rows of sheshem trees. The population is Hindu. The people are ignorant and unlettered. They are hard-working. From early morning till late at night they are in their fields. When the crops are ripening it is necessary for guards to watch over them night and day to protect them from robbers and wild animals. The people are not physically strong. They do not as a rule have sufficient food to keep them physically efficient. Malarial fever is very bad and often thirty to fifty per cent. will be down at one time. The effects of this economically are far-reaching.

The land is as level as a billiard table top, of heavy clay. The average size of the farms is four acres. The farming is diversified. Two crops may be raised each year, one a rainy season crop of Indian corn or millet; sugar cane takes ten months. The dry season crops are wheat, barley, field peas and legumes. Tobacco and cotton are also grown. Castor and other oil seeds come in regular order. All the farming

follows a regular system of crop rotation. The roads are mostly macadam and kept in an excellent state of repair. The rest of the roads are dirt and except during the rainy season are good.

The farms are all owned by landlords, part of whom are absentees, part of whom live in the village. The tenants are all permanent and cannot have their land taken away from them, or their rent enhanced except by due process of law. In the normal course of events the rent is fixed once each thirty-three years by a specially appointed official, known as a settlement officer, who is an expert, and knows local conditions and is aware of changes in the value of lands due to growth of population, the coming of railroads, and the development of irrigation schemes. The imperial taxes are taken from the landlord and are about fifty per cent. of the total rent. Another eight per cent. goes for local taxes and dues, leaving forty-two per cent. of the total rent as the landlord's share. It is thus to the landlord's interest to raise the rent whenever possible and if any change takes place that increases the value of the land the landlord will resort to the law to get the rent raised.

The village as a whole has little to do with the neighboring villages and among its own members there is little cooperation or mutual helpfulness. There are certain men who serve the village and each of the families that uses the services of such men pay a certain fixed amount of produce at harvest time. Such village servants are the water carrier the weaver, the scavenger, washermen, the one who cares for the

dead animals, and tans the hide and makes leather goods, the tile maker, the carpenter, who makes the plows and other farming implements. Each of these men in addition to following his own trade is a farmer on his own account, but his holding is less than the average. There is one large brick cylindered well in the village from which all get water, but the leather worker and scavenger and other menials are not allowed to draw from the well, but must be supplied by the professional water carrier.

The village is organized with a headman and a committee or panchayet. The headman is the go-between for the government and the common people. If there is crime committed in the village he is to investigate and report. He fills out census blanks. There is a Brahmin priest who looks after the religious interests of the villagers. He serves in the temple where the idol is. He often reads from the sacred books to his people. He declares the auspicious days for betrothals, weddings, journeyings, pilgrimages when to plow, to sow, to reap. He is the only one in the village who can read or write in any language, and he therefore wields great power.

There is no school of any kind, and if there were the poverty is such that none of the villagers could afford to send their children to school. The services the children render are to look after the goats and pigs as they graze and roam in search of food, to keep guard over the standing crops, to collect twigs, weeds and cowdung for fuel, to drive the oxen which draw water from the wells in the fields for irrigation. Less than one-half of the villages in the United Provinces of Ayra and Budh have any school facilities whatsoever.

By the laws of the caste system it is impossible for any member of the vil-

lage to change his occupation. There is a very light movement of surplus population to the cities and mining districts.

The people are in about the same place they were in the time of Noah. That is, their chief interests are marrying and giving in marriage. The marriage ceremonies last several days and the money expended in the attendant revels is generally enough to keep the families in bondage to the professional money lender for the whole course of their natural lives. I knew a man whose total income was no more than one dollar and fifty cents per month for his whole family, the marriage of whose daughter cost him twenty dollars. He borrowed this money at four and one-half per cent. per month, so that each month if he paid up his interest it took three fifths of his scanty income and left him with sixty cents with which to keep himself, his wife and two remaining children. Of course he could not keep up his payments of interest, to say nothing of repayment of principal, because he had other debts as well, and so he is practically a serf of the money lender out of whose clutches only death can snatch him.

The people are thus hopeless and fatalistic and the drawbacks in such a community are summed up in the words poverty and ignorance.

The remedies are—primary education and anything that will bring back hope and heart to these industrious people, for they are as patient and industrious as any people on earth, but as Enoch Arden found, "Work without hope is dead." Their poverty is at once both the cause and effect of their degradation. The oxen used for draft purposes will not average in value over fifteen dollars a pair. The household furniture, cooking utensils, wearing ap-

parel and farm implements of the average family could be bought new for less than three dollars all told.

Another ray of hope is in the growth of the cooperative banks modeled on the

Raiffeisen societies of Germany. Wherever these have had a fair trial the condition of the villages has improved in a truly remarkable degree.

A Visit to the Ohio Orchard Company's Farm

By Harry A. Marsh

On May 28, 1910, a party of about 20 students interested in Horticulture made a visit to "Prof. Davis' Orchard Farm," as it is generally known among the students. It is possibly better known in the neighborhood where it is located simply as the "Orchard Farm." It is located on the northern banks of Big Darby Creek, between Milford Center and Unionville, Ohio. It is gently rolling land, which is noted in that vicinity as being very poor. Its non-fertility is particularly noticeable, since it is contrasted by the extremely black fertile soil of the Darby Plains, which lie just across the creek.

The farm itself consists of about 145 acres and about 100 acres of that being set out in fruit. The remaining 45 acres are devoted to general farming to feed the necessary farm stock, until the orchard will produce enough to pay the running expenses, and then all feed will be bought and this section will be set out to fruit also.

At present there are about 6300 apple trees, 500 pear trees, 700 peach

trees, 200 cherry trees, all ranging in age from four years to those just set out. They also have five acres of blackberries, of which three acres are in bearing; four acres of raspberries, of which two acres are in bearing, 2000 currant bushes, 1500 gooseberry bushes and one and a half acres of strawberries.

They are using the mulching system of cultivation for the tree fruits. This year about the middle of June they will mow the grass and weeds in the orchard and put it around the trees for the mulch. They also use commercial fertilizer and large quantities of stable manure.

The people in the vicinity of the farm look upon the project as a sort of an experiment and not as a practical undertaking. If Professor Davis' dream comes true and the project is a grand success, as we all hope it will, and it is altogether a reasonable one, it will have a moral influence upon that community at least of awakening the horticultural interest which it certainly needs.



A MONTHLY MAGAZINE DEVOTED TO THE
INTERESTS OF FARMING, STOCK-RAISING
DAIRYING AND CREAMERY WORK

Published by The Agricultural Student
Pub. Co. in connection with the Agricultural
College of Ohio State University.

EDITORIAL STAFF

H. B. McClelland, '10.....Editor-in-Chief
H. R. Watts, '10.....Business Manager
R. W. Kelley, '11.....Asst. Business Mgr.

Associate Editors:

D. C. Mote, '11. F. S. Bull, '10.
O. W. Reagin, '10. P. W. Barnes, '11.
H. M. Call, '11. H. C. Hyatt, '11

SUBSCRIPTION PRICE

One year (9 issues)	\$0 50
Half year	30
Single copies	10

Advertising Rates on application.

All literary matter should be addressed to
the Editor; and all business communications
to the Business Manager.

Entered at the postoffice at Columbus, Ohio,
as second class matter.

COLUMBUS, O., JUNE 15, 1910.

EDITORIAL

With this issue The Agricultural Student passes the sixteenth milestone of its existence. Throughout its career there have been slight modifications made from time to time under the supervision of its different managements, but its aim, promotion and advancement of agricultural education has ever remained the same.

Since it is a magazine devoted strictly to agricultural topics and coming from the hands of the students themselves, who are devoting their time and interest to this particular phase of sci-

ence; to them it should be of prime interest, and each and every one should feel a personal responsibility to it and strive in every possible way for its betterment.

To the ex-student it should be a link connecting him with his Alma Mater. To him it will bring forth past recollections and remind him of the many happy, although somewhat strenuous, days of his past career, and bring him in touch with the affairs of his college, where the foundation for his success in life was laid.

Agriculture, like every branch of science, has been developing and broadening its field of influence. Along with it has come "The Student." Through its many handicaps and misfortunes it has always survived and has made itself felt throughout its scope of circulation. In the future we hope that its field of influence will broaden and not only be felt at home but elsewhere in the state and agricultural world.

The agricultural college is judged largely from its productions. Of course, to a large extent by its students, but from its publications as well. Therefore it is up to everyone to boost and use his influence in every possible way. Let us not forget the motto, "In Union There Is Strength."

At the close of this school year, there are many that are leaving for the last time; that have, in the past, been intimately associated with "The Student." We hope that their spirit will still remain with us, and that they will feel it their duty to assist in every possible way for the welfare of the magazine. They are the ones, inspired by their loyalty, that can make their assistance felt, and the same will be greatly appreciated.

To those that have completed their courses and are stepping forth in the

world to put into practice the many principles the foundation for which they received here, "The Student" extends congratulations and wishes them the greatest of success.

Dairy Special in Northeastern Ohio

May 24 to 26 a dairy special was conducted over the Erie railroad. The train was composed of three cars for lectures and one car in which well-bred and high-producing cows were exhibited. This feature was a departure from the usual method of operating such trains and proved to be of great advantage in showing the contrast between the high bred and the common cow.

An imported Jersey cow was supplied by Mr. J. S. Miller, of Ellsworth, Ohio; a fine type of Guernsey cow was furnished by Mr. Myron C. Wick, the owner of one of the best Guernsey herds in the state; and Mr. J. A. Watson, of Youngstown, provided a fine specimen of the Holstein-Friesian breed. A scrub cow of the dual purpose type was provided and many practical object lessons were plainly drawn in contrasting this cow with the high bred cows of the various breeds. The essential points that should be observed in selecting cows for milk and butter fat production were very plainly illustrated.

Stops were made at nearly every station between Cleveland and Warren and between Warren and West Salem. Evening meetings were held at Warren and at Akron. An average of 200 people attended the meetings at each stop, which shows the growing interest in this branch of agriculture and the appreciation of the farmers of the state of the opportunity given them to receive a dairy education at their very doors. They are beginning to realize that

something must be done to redeem the fast depleting soil fertility and to recognize the fact that the dairy cow is the quickest and surest means to this end.

During the hour and a half stop at each station lectures were given by Oscar Erf, Professor of Dairying, Ohio State University; Ernest Kelley, of the United States Department of Agriculture; A. S. Neale, President of the Ohio State Dairymen's Association; L. P. Bailey, the well-known Jersey breeder; C. H. Drissen and R. E. Frederick, prominent dairymen of the State.

The Agronomy Department is doing a number of things in corn breeding this year. Among other things it is running a variety test on twenty different strains of corn sent in by the various corn breeders of the state. It is running a series of tenth-acre test plots on corn that has been bred on the University farm. If the corn passes the test, it will be given a name and a number according to the rules of the Ohio Plant Breeders' Association and will be known as Ohio Standard Corn. Besides the above plots the Department is running a merging plot and an ear row test plot. The seed for the merging plot was taken from the remnants or three or four ears giving the highest yield last year in an ear row test plot. At the proper time the plants arising from at least two of these ears will be detasseled to prevent inbreeding. The corn resulting from this cross will be tested next year against three other strains of corn and, if it proves worthy, will be given a name. The seed used in the ear row test this year was carefully selected, photographed and the various data recorded.



NEWS NOTES



Field Lectures at the Wooster Experiment Station

It is a custom to hold lectures at the Experiment Station at Wooster each year a short time before wheat harvest. In the past, these meetings have been very profitable and pleasant occasions. Last year there was a very general attendance of farmers from over the state, as well as members of the faculty of the College of Agriculture at O. S. U.

Past success and present interest in the subjects to be studied, have encouraged Director Thorne to somewhat extend the program for this year. In addition to the regular wheat-field meeting, and in cooperation with Secretary Sandles of the State Board of Agriculture, a meeting of institute workers will be held during the same week. This meeting will begin on Wednesday, June 22nd, in the afternoon, and be followed by the field lectures, continuing until Saturday, the 25th. Students will be welcome at the field lectures and no doubt a number will be in attendance. The Advanced Crops Class will make the trip in charge of Professor McCall.

PROGRAM.

Meeting of Institute Workers and
Wheat Field Meeting, June
22-25, 1910.

Wednesday, June 22.

Afternoon, 1 to 5—Inspection of Orchard and Garden, with Talk by Mr. Green.

Evening—The Fertility Work of the Ohio Station, Director Thorne.

Thursday, June 23.

Forenoon, 7:30 to 11:30—Inspection of the Fertility Work.

Afternoon, 1 to 5—Inspection of Variety Testing and Other Work.

Evening, 7 to 9:15—Entomological Work of the Station, with lantern slides; Pathological and Botanical Work of the Station, with lantern slides; Forestry Lecture.

Friday, June 24.

Forenoon, 7:30 to 11:30—Animal Husbandry, Nutrition, Cooperation.

Afternoon, 1 to 5—General Inspection of Field Work; Exhibits of Ohio Wheats, Millets and

Evening, 7 P. M.—Addresses by Hon. A. P. Sandles, Director Thorne and President Penna. System of N. Y. Central R. R.

Saturday, June 25.

Morning—Further inspection of Station work, with an opportunity to interview the heads of departments.

Prof. Plumb has recently attended some noted pure bred live stock sales. On May 19, at Athens, Tenn., he was present at the sale of the older cattle in the Jersey herd of Maj. Gettys, the most noted Jersey breeder south of the Ohio river. A beautiful lot of cattle sold in this sale, at an average of \$255 per head. On May 24 Prof. Plumb and Mr. Fyffe attended the Carpenter & Ross Shorthorn sale at Mansfield, where 58 head sold at an average of \$400. The University purchased one at a cost of \$450, a very beautiful daughter of Avondale. This is one of the most noted annual Shorthorn sales in America, with leading breeders from all over the country. At this sale cattle were bought for Illinois, Canada, Indiana, Texas, Kentucky, Iowa, Pennsylvania and elsewhere. On Friday, May 27, at

Lisbon, O., at a sale of Jersey cattle of Bowman & McCamon, Prof. Plumb purchased three head for the University, one an imported three-year-old cow, one a two-year-old about to come fresh, and a yearling. These were among the choicest females sold in this sale, and will bring a much needed addition to our University herd.

The dairy cattle class has been having some interesting work this term. They have visited the Hartman Farm herd of Jerseys, the Derrer Bros.' herd of Holstein-Friesians at Camp Chase, and Bert Smith's Jersey herd at Lewis Center. At each farm judging practice was engaged in and some very useful experience secured by the class. Each of these herds is of distinct merit, and their closeness to the University is fortunate for the students taking Dairy Cattle. It is also to be noted that the proprietors are most generous in the use of their stock, showing great interest in the work of the boys.

The University Grange initiated a large number of candidates in the third and fourth degree Saturday evening, May 28. The session was purposely made short, as a banquet had been prepared for the latter part of the evening. After adjourning the crowd made their way to University Hall, where plates for seventy had been laid. The rest of the evening was heartily enjoyed by all and an attempt was made to give the new members a hearty welcome.

The dairy herd of the University has never been in such a satisfactory condition as at the present time. The cattle are in the best of health, a fine crop of most attractive heifer calves is already on hand as a result of the past few months' calving record, while the

herd from a producing point of view is making an excellent showing. Some official tests will be commenced early this summer, with the hope of making some creditable records.

In May, 1909, the imported bull, Derry's Golden Jolly, was sold in the Walker sale at Rushville, Ind., to Sheffield Farm, Glendale, O., for \$11,000, the highest price ever paid for a Jersey west of the Alleghenies. In about three months Derry's Golden Jolly died suddenly, and recently Prof. Plumb has been presented with Derry's horns, to add to his collection of souvenirs of noted animals.

The American Shropshire Sheep Association has recently donated to the University a duplicate set of its flock books. On account of the large amount of class work done with the herd books, the Animal Husbandry Department is gradually securing some duplicate sets, in order to protect the valuable collection now in the Live Stock Pavilion.

George E. Boltz, '10, and E. W. Bennage, '09, who for the past year have been assistants in Agricultural Chemistry, have secured positions elsewhere. G. E. Boltz has gone to Wooster, where he has secured a position in the Chemistry Department at the Experiment Station. E. W. Bennage is located with the Jericke Fertilizer Co., Sandusky, O.

Gov. Harmon has appointed Dean H. C. Price, Director Thorne, Secretary Sandles, Benj. Harmon and G. H. Stevenson, Secretary of the National Corn Exposition, to arrange for an Ohio Conservation Congress at the National Corn Exposition, to be held next February.

Prof. Plumb has had calls from a half dozen colleges for men to fill positions in Animal Husbandry. The interest in Ohio State trained men in Animal Husbandry, on the part of other institutions, is very gratifying to the instructional force.

A bulletin has recently been published by the Extension Department which contains a very interesting and instructive article by Prof. C. S. Plumb on "A Lesson in Judging Swine," and also an article by Prof. Graham on "Root, Stem and Leaf."

There has been an unusual call for young men for practical work in Horticulture at the Horticultural Department this spring. Many of these places could not be filled.

At the June meeting of the Agricultural Society a very interesting and instructive illustrated lecture was given by State Dairy and Food Commissioner Dunlap, on the subject, "How Food Laws Affect the Farmer."

Chas. Snyder, '09, now connected with the National Stockman and Farmer, was in Columbus during the Big Six, visiting friends and the college.

M. E. Laird, '07, now connected with the Omaha Packing Co., at South Omaha, paid his college and friends a visit on May 28.

Wm. Palmer, '06, was at the University on business during the week of May 24.

Feeding the Farm Teams

The farm team is deserving of the very best possible care. Feeding rations for work horses is one of the questions always discussed with interest at farmers' meetings, and yet there is still quite a pronounced lack of unanimity of opinion with regard to how horses should be fed. There is no other animal on the farm that must be fed with so much judgment as the horse. With cattle, hogs or sheep a prescribed ration may be outlined and any person capable of following instructions can do the work. This is not the case to so large an extent with horses. Their feed must be regulated by the work done, and when work stops the feed should certainly be reduced. On account of the difficulty of

reducing horse feeding to rule, there has not been so much experimental work done with this class of live stock as with the meat animals.

Old country ploughmen know about as much about what a work horse needs as any class of men. From November to April, when the work is as heavy as at any other time of the year, the nightly feed of boiled barley is considered as essential. Whether the work be plowing or carting, the teams require heavy feeding and they thrive on the barley once a day.

It is hard for us to get a better feed than oats, and it takes a big horse and heavy work to require more than a gallon of this cereal at a feed. This amount of oats three times a day with

a boiled feed at night once or twice a week should keep almost any team in good working condition.

The greater part of the energy derived from feed is expended by the horse in doing work. A working horse does not lay on much fat, but if he is properly fed he should maintain his weight. It is obvious that as soon as work stops there is no need for more than enough feed to supply sufficient energy to maintain the bodily functions. Feeding an idle horse heavily simply clogs the system with unused material, and, if long continued will produce any number of ill results. An idle horse needs no more than two quarts of oats at the most at a feed. In fact that is just what the big Winnepeg fire teams receive along with hay at night, just what they will clean up. Fire horses are not required to do extremely heavy work and, as a rule, that not very often. So they are comparatively idle horses.

The farm team can easily be fed too much hay. Good hay may not hurt them, but it is only a waste, to say the least, to keep their mangers continually crammed full. The boiled feed, or an occasional bran mash, with a handful of oil meal mixed in with it, will keep the system loosened up and promote a healthy digestion.

Our Great Mid-Winter Clearance

Is Now in Progress

Generous Reductions on Men's Suits and Overcoats, Furnishings and Shoes.



HIGH & LONG STS. COLUMBUS, O.

REWARDS OF TOIL.

There is a time in every man's education when he arrives at the conviction that envy is ignorance; that imitation is suicide; that he must take himself for better, for worse, as his portion; that, though the wide universe is full of good, no kernel of nourishing corn comes to him but through his toil bestowed on that plot of ground which is given him to till. The power which resides in him is new in nature, and none but he knows what that is which he can do nor does he know until he has tried.—Emerson.

Citizens 3796

Bell 1590

HIGH STREET TAILORS

166 N. HIGH STREET

are showing the most extensive line of blue, gray and green fabrics ever offered in Columbus. Newest patterns. Best paid cutters in the city.

POPULAR PRICES.

Let us build a suit that will enlarge your circle of friends. CALL.

Prominent Breeders of Live Stock

We know these breeders to be reliable and safe.

BERKSHIRE SWINE

The home of LONGFELLOW PREMIER C, 98700. Pronounced by the best judges of America the greatest Berkshire Boar in the world. Stock of either sex for sale by Longfellow Premier C; sows bred to Longfellow Premier C.

A. E. FISHER

Grove City, Franklin County, Ohio.
P. O. Orient, Ohio.

Cherry Valley Devon Herd

My Devons are bred for milk and beef qualities. The farmers' cow and no mistake. Call and see my herd and be convinced that the Devon is the best of cattle for beef, butter, milk and beauty.

J. C. SHAW

P. O. Box 537

NEWARK, OHIO.

Maxwalton - Shorthorns

We breed them, show them, win with them, and sell them at prices to suit all.

CARPENTER & ROSS, MANSFIELD, OHIO

OAKLAND SHORT HORNS

The result of the past season's showing at the leading fairs and stock shows is good evidence of the quality and high grade of the Oakland Herd. The calves of

GLENBROOK SULTAN

the great breeding bull, have been outranked but once in the past season's shows.

Visit the farm and be convinced that the best are found there.

THOS. JOHNSON & SON

COLUMBUS, OHIO

Ralph Postle,

F. L. Postle,

Wayne C. Postle

WHITE-STOCK FARM

SHORT HORN CATTLE

YORKSHIRE SWINE

SHROPSHIRE AND CHEVIOT SHEEP

F. L. POSTLE & SONS

FRANKLIN CO., CAMP CHASE, O.

Kindly mention THE AGRICULTURAL STUDENT when answering Advertisers.

America's Leading Horse Importers

AT THE GREAT ANNUAL SHOW OF FRANCE, 1909, held under the auspices of the Societe Hippique Percheronne at Nogent-le-Rotrou, OUR STALLIONS WON

FIRST PRIZE IN THE FOUR-YEAR-OLD CLASS
and FIRST PRIZE IN THE THREE-YEAR-OLD CLASS.

We have for sale THE BEST and will continue to have the BEST PERCHERONS that can be found in France.

McLAUGHLIN BROS.

Columbus, Ohio.

Kansas City, Mo.

St Paul, Minn.

BLACKWOOD, GREEN & CO.

HARDWARE

STOVES AND HOUSE
FURNISHING GOODS
SLATE and METAL ROOFING

624 NORTH HIGH STREET
COLUMBUS, OHIO

FRATERNITIES AND BOARDING CLUBS

Always Find Our

MEATS AND GROCERIES

Strictly First Class

ABERNATHY BROS.

1609 HIGHLAND STREET

Citz. Phone 16504

Bell, North 857

See Doc Levison for Fine TAILOR MADE Suits

Milk Flavors

Milk may be contaminated in two ways—by absorbing flavors from certain substances or by becoming infected with bacteria, due to lack of cleanliness.

Most dairymen realize that greasy soaps and lye do little more than remove the dirt which you may see, too often leaving the ruinous bacteria to infect the milk.

Experience has also taught them the superior pleasing properties of

Wyandotte Dairyman's Cleaner and Cleanser

Indian in Circle



In Every Package.

This unusual washing preparation contains no impure or harmful ingredients. Its unusual cleansing power positively cleans, sweetens and purifies, leaving nothing to contaminate or injure. It is inexpensive and easy to use. Ask your dealer.

THE J. B. FORD CO., Sole Mfrs.
WYANDOTTE, MICH., U. S. A.

This Cleaner has been awarded the highest prize wherever exhibited.

Martin's Art Studio

703 NORTH HIGH STREET

Will make you better Photos, more life like and better finish than any gallery in the City. We don't charge you for a finely equipped gallery and reputation: we charge a living price and make you the best possible picture. Special rates to O. S. U. students for groups and individual photos. We guarantee all our pictures. Our styles are exclusive.

Try us next time you want photos. Frames Made to Order.

Just South of Buttlers Ave., 703 NORTH HIGH ST.

**MEN'S FURNISHINGS,
DRAWING INSTRUMENTS
and MATERIALS,
STUDENTS SUPPLIES.**

MADDOX & KILGORE

HIGH ST., OPP. EAST 11th AVE.

SPECIAL OFFER FOR SENIORS

From now and until Commencement we make an extra special offer of \$3.50 per dozen, for our entirely new Cabinet **STUDENT FOLDER**, a folder made especially for us in Berlin, Germany. It is far superior in make and artistic appearance to those offered by the average gallery. The folder is perfectly made and presents an elegant appearance and will be finished in our usual high grade—the best. In addition to this, with each order of one dozen photographs we will furnish you an extra photo without charge to be used in the Makio, printed on a special paper which secures superior half tone results.

While this offer to Seniors is going on, any student of O. S. U. can have the same rate. Do not fail to come in at once. Special offer on any other styles.

We do not have agents selling tickets, but if you have bought one bring it in and we will give you credit for amount you paid on any order you leave with us.

In making society and fraternity groups we have no equal.

—THE OLD RELIABLE—

Baker Art Gallery
COLUMBUS, O.

“THE COLLEGE INN”

“DAVE” WARWICK, Proprietor.

Bowling, Pool, Billiards, Cigars

FREE SOUVENIRS

RESULTS OF ALL GAMES POSTED

THE DIFFERENCE

between the man who is careless in his attire and the man who dresses neatly and becomingly, is a matter of self-respect, but it is that self-respect which lifts him over the heads of others, socially, fashionably, commercially and professionally. We cater only to the man who respects his appearance and Fashion's embellishments.

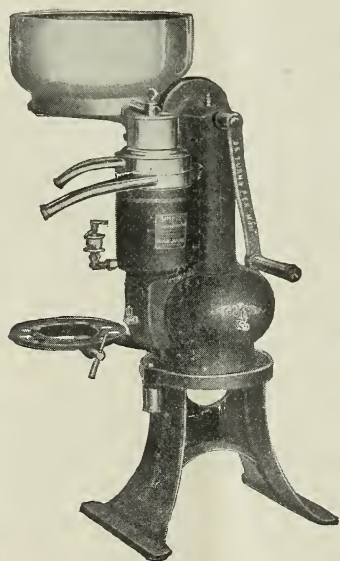
The “So-Different” Tailory
1541 NORTH HIGH ST.

If you saw it in THE STUDENT, tell the Advertiser so.

THE CHITTENDEN IS STILL OPPOSITE

B. FROSH & SON, --- TAILORS ---

204 — NORTH HIGH STREET — 204



The 1910 "Simplex" Link Blade Cream Separator

LIGHTEST RUNNING.

LARGEST CAPACITIES.

CLOSEST SKIMMING.

The Only Practical Large Capacity Separator

Has more exclusive patented features of merit than all others—Has all the desirable points that can be put into a cream separator.

500 lbs.....\$75.00	900 lbs....\$ 90.00
700 lbs..... 80.00	1100 lbs.... 100.00

D. H. BURRELL & CO., Manfrs., Little Falls, N.Y.

We are complete outfitters of all plants for handling milk products. If you are in the dairy manufacturing business in any capacity and want to keep up with latest and best methods, or if you are thinking of going into it, the first thing to do is to get into communication with us. We are at your service in the planning, building and equipping of Creameries, Cheese Factories, Sanitary Milk Plants and Private Dairies. Our experience in this line is worth money to you, yet it costs you nothing but the asking.

CREAMERY PACKAGE MFG. CO.

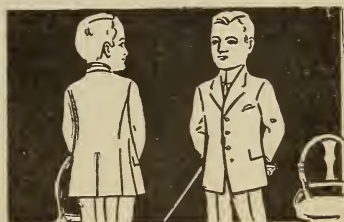
61-67 WEST KINZIE ST.
CHICAGO

MEET ME
at the

Varsity Barber Shop

*Cigars, Tobacco
Cigarettes
Candies
Pool & Billiards*

E. E. GRABILL, Proprietor
Bell Phone, North 59



Smart
Snappy
Stuff

... for ...

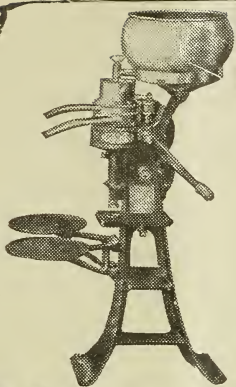
\$20.00 to \$30.00

Columbus Tailoring Co.

149 N. High

F. C. RICHTER, Prop.

It helps us and pleases the advertiser when you say, "I saw it in THE AGRICULTURAL STUDENT."



EVERYBODY HAVING COWS
WILL SOME DAY USE A

DE LAVAL CREAM SEPARATOR

Nearly 1,200,000 farmers, creamerymen, milk dealers and owners of country homes, throughout the world, are already using De Laval Cream Separators, and 150,000 or more are being added to the number every year—many more this year than ever before.

If you haven't a De Laval Cream Separator already you can't be anywhere near the head of this tremendous procession that started thirty years ago, but it will be foolish to wait to bring up the tail end of it.

The use of a De Laval Cream Separator—with even a single cow—means more and better cream and butter, warm and sweet skim-milk, less labor and more profit, twice a day every day in the year.

A De Laval Cream Separator saves its cost in a few months, not only over any other method of creaming milk but over any imitating cream separator.

Then why not fall into the De Laval procession now? You can't recover the waste and worry of previous years, but you can stop it going further. Why not do so? Every day or delay means just that much more waste of product, quality and dairy comfort. Why prolong it?

De Laval Cream Separators are made for one cow to one thousand, in proportionate size, style and price, and sold for cash or on such reasonable terms that they actually pay for themselves.

They are sold direct or through local agents. If you don't know the nearest agent write for his name and a catalogue, which we shall be glad to send you.

THE DE LAVAL SEPARATOR CO.

RANDOLPH & CANAL STS.
CHICAGO

1213 & 1215 FILBERT ST.
PHILADELPHIA

DRUMM & SACRAMENTO STS.
SAN FRANCISCO

General Offices:

74 CORTLANDT STREET,
NEW YORK.

173-177 WILLIAM STREET
MONTREAL

14 & 16 PRINCESS STREET
WINNIPEG

107 FIRST STREET
PORTLAND, OREG.

